

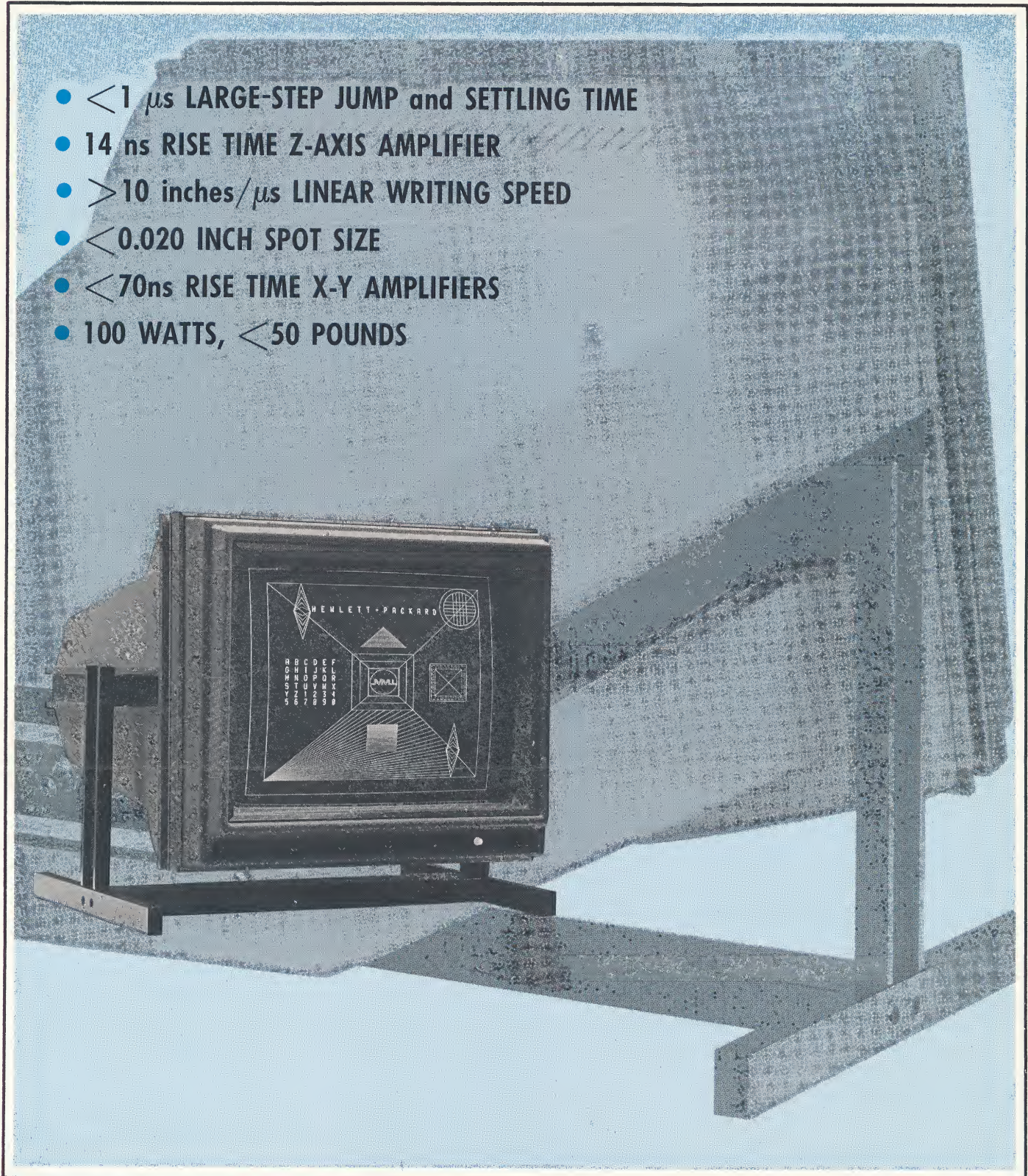
(Quotation) Dec 71

HIGH SPEED 14" and 19" GRAPHIC DISPLAYS

Models
1310A
1311A

TECHNICAL DATA 1 JUL 71

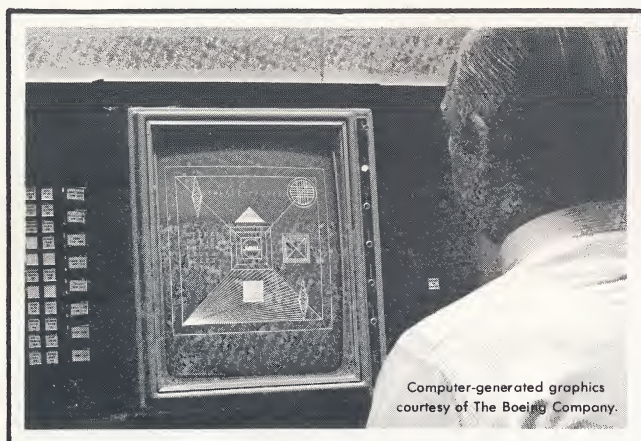
- $< 1 \mu\text{s}$ LARGE-STEP JUMP and SETTLING TIME
- 14 ns RISE TIME Z-AXIS AMPLIFIER
- $> 10 \text{ inches}/\mu\text{s}$ LINEAR WRITING SPEED
- $< 0.020 \text{ INCH}$ SPOT SIZE
- $< 70\text{ns}$ RISE TIME X-Y AMPLIFIERS
- 100 WATTS, $< 50 \text{ POUNDS}$



For more information, call your local HP Sales Office or East(201) 265-5000 . Midwest (312) 677-0400 . South (404) 436-6181
West (213) 877-1282. Or, write: Hewlett-Packard, 1501 Page Mill Road, Palo Alto, California 94304. In Europe, 1217 Meyrin-Geneva

ADVANCED DISPLAY PERFORMANCE

Models 1310A and 1311A are directed beam, high speed 19" and 14" graphic displays that offer unexcelled dynamic performance. For the first time, a display matches speeds with computer generated graphic information. This speed is made possible through significant advances in large screen cathode-ray tube design. The electrostatic CRT provides a crisp, small spot anywhere in the large quality area of the CRT. Also, the CRT has a more rectangular shape than previous displays and information can be written anywhere in this large viewing area. Bright, easy-to-see displays result from the 28.5 kV accelerating potential while X-ray emissions are unmeasurable, ensuring a safe operating environment.



HIGH WRITING SPEEDS

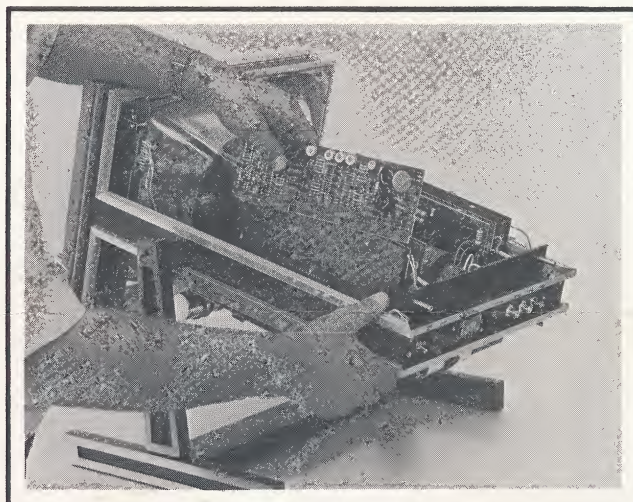
Linear writing speed is an unsurpassed 10 inches per microsecond which allows character strokes to be written in less than 100 nanoseconds. Maximum slew rate of the electronics is >100 inches per microsecond. The large-step jump and settle time is $1 \mu s$. This offers tremendous programming simplicity since characters and vectors can be plotted in random fashion from anywhere in the display area. A typical application of this exceptional speed would be to plot a video signal on the display and write characters or vectors during the vertical retrace or blanking interval. Point plotting time for small steps is less than 200 ns per point thus, matrix type displays are written in minimal time.

ELECTROSTATIC DEFLECTION

Electrostatic deflection replaces deflection coils needed by magnetic CRTs and the high powered circuits to drive the coils. The power consumption of these displays is a scant 100 watts which eliminates noisy fans and over-sized mechanical cooling assemblies. Electrostatic deflection ends the need for major and minor deflection systems with multiple input connections. The single differential input for each axis significantly reduces the effects of common mode signals. Input RC is 10 kohms shunted by <40 pF with switchable 50 ohm terminations available when required.

MODULAR CONSTRUCTION

Internal construction is modular, rugged, and very serviceable. Plug-in circuit cards, reduce calibration or trouble shooting time. Also, a board exchange program assures minimum down time since fully tested circuit boards are air-parceled from the HP parts center.



These displays are supplied with open frame construction for mounting in a standard 19-inch rack or in your custom designed enclosures. Covers and a tilt stand are available for free standing applications. Refer to Options and accessories in the specifications for listings of the standard items that are available. Contact your HP Field Engineer for information about items not contained in this data sheet.

HEWLETT-PACKARD SERVICE

Your purchase of a Display from Hewlett-Packard includes more than a piece of hardware — you get long-term display capability far more valuable than the worth of components that make up the instrument. Your display will meet its specifications when received and continue to operate reliably for many years to come.

Applications assistance provides maximum value from your equipment, first with the instruction manual supplied with each display and then with the many Hewlett-Packard user-oriented publications. Also, training seminars provide hands-on experience with displays and other related HP equipment. HP service seminars give service technicians first-hand experience and training.

Assurance that your instrument will continue to operate as expected for years to come is provided by the high reliability and quality components used in HP instruments and is backed-up by a world-wide customer service organization. A nearby Hewlett-Packard field office allows you to get information, replacement parts, or service assistance when needed. This customer service program is one of the major factors in Hewlett-Packard's reputation for integrity and responsibility towards customers.

SPECIFICATIONS

VERTICAL AND HORIZONTAL AMPLIFIERS

RISETIME: 70 ns, 10% to 90% points for full screen deflection or less.
BANDWIDTH: dc to 5 MHz (3 dB down at 5 MHz) with 3.5 in. deflection in 1311A and 5 in. deflection in 1310A.

PHASE SHIFT: $<0.1^\circ$ to 50 kHz and $<1^\circ$ to 250 kHz for full screen signals.

LINEAR WRITING TIME: <100 ns/inch

LINEAR WRITING SPEED: >10 inches/ μ s

DIAGONAL SETTLING TIME: signal settles to within 1 spot diameter of final value in $<1 \mu$ s for any on screen movements.

SEQUENTIAL POINT PLOTTING TIME: signal settles to within 0.01 in. of final value in <200 ns for any 0.1 in. step.

REPEATABILITY: $<0.15\%$ of full screen error for re-addressing a point from any direction on screen.

CROSSTALK: <0.015 inch with one input shorted and the other input excited by 500 kHz.

DEFLECTION FACTOR*		
	Vertical	Horizontal
1310A	1 volt for 11 in. deflection	1 volt for 15 in. deflection
1311A	1 volt for 8½ in. deflection	1 volt for 11 in. deflection
*Horizontal and vertical deflection factors adjustable from front panel control with attenuation of 1.75:1.		

SPOT JITTER and MOTION: <0.025 inch

POSITION: zero input can be set to any on screen position

POLARITY: positive vertical input moves beam up; positive horizontal input moves beam right. Polarity can be reversed by changing internal lead connections.

INPUT RC: driven side 10 kohms shunted by <40 pF. Shield input is 47 ohms to ground. This can be replaced with 10 kohms for differential input. A switchable 50 ohm termination between shield and center conductor is also provided.

MAXIMUM INPUT: ± 50 V (dc + peak ac) with 10 kohm internal termination ± 5 V (dc + peak ac) with 50 ohm internal termination.

LINEARITY: 1% of full scale display along major axes.

DRIFT: 0.05 inch/hour and 0.10 inch in 24 hours with covers installed.

Z-AXIS AMPLIFIER

RISETIME: <14 ns.

SENSITIVITY: 1 V provides full blanking or intensity.

INPUT POLARITY: internal switch selects polarity (switch is normally set so negative voltage unblanks signal).

GAIN ADJUST: internally adjustable over 2.5:1 attenuation ratio.

BALANCE: internal adjustment provides ± 1 V offset.

INPUT RC: approx 10 kohms shunted by approx 60 pF. 50 ohm termination may be selected with internal switch.

MAXIMUM INPUT: ± 50 V (dc + peak ac) with 10 kohm internal termination ± 5 V (dc + peak ac) with 50 ohm internal termination.

CATHODE-RAY TUBE

VIEWING AREA

Model 1310A (19 in.): 11 in. high, 15 in. wide.

Model 1311A (14 in.): 8½ in. high, 11 in. wide.

TYPE: post-accelerator, 28.5 kV accelerating potential, P31 aluminized phosphor is standard (refer to options for other phosphors). Electrostatic focus and deflection.

SPOT SIZE		
	Spot Size in Quality Area	Size of Quality Area
1310A	0.020 inch	11" x 11"
1311A	0.015 inch	8½" x 8½"

RESOLUTION: 67 lines/inch using shrinking raster method.

BRIGHTNESS: at least 50 foot-lamberts measured at 0.1 in./ μ s, 60 Hz rate, with spot size of 0.020 in. on 1310A and 0.015 in. on 1311A.

CONTRAST RATIO: 4:1 or greater.

X-RAY EMISSION: CRT emission not measurable, with Victoreen Model 440RF/C, in background noise.

IMPLOSION PROTECTION: rim and tension banding prevents implosive evacuation.

PHOSPHOR PROTECTION: circuit detects absence of deflection and limits beam current.

GENERAL

X, Y, AND Z INPUT CONNECTORS: BNC type mounted to rear panel.

WEIGHT

Model 1310A: net 53 lb (24 kg), with covers 59 lb (26.8 kg); shipping, 71 lb (32.2 kg).

Model 1311A: net 40 lb (18.1 kg), with covers 45 lb (20.4 kg); shipping, 62 lb (28.1 kg).

DIMENSIONS: refer to outline drawing.

POWER: 115V ac $\pm 10\%$ or 230 V ac $\pm 10\%$, 48 Hz to 440 Hz, maximum power 115 VA.

ENVIRONMENT

Temperature: 0° to $+55^\circ\text{C}$ operating, -40°C to $+70^\circ\text{C}$ non-operating.

Humidity: up to 95% relative humidity to 40°C .

Altitude: up to 15,000 ft operating; up to 25,000 ft, non-operating.

Shock: 30 g level with 11 ms duration and 1/2 sine wave shape.

Vibration: vibrated in three planes for 15 min. each with 0.010 inch excursion, 10 to 55 Hz.

PRICE

Model 1310A: 19-inch Display \$3000.

Model 1311A: 14-inch Display \$2875.

OEM discounts are available.

ACCESSORIES SUPPLIED: rack mount adapter kit and front panel cover.

OPTIONS (order by option number)

003: top and bottom covers with tilt stand, add \$100. (Rack mount adapter not supplied with Option 003 instruments.)

005: neutral-density contrast screen improves trace contrast for easier viewing. Add \$40 for 1310A or \$30 for 1311A.

604: P4 aluminized phosphor in lieu of P31, no charge.

607: P7 aluminized phosphor in lieu of P31, no charge.

639: P39 aluminized phosphor in lieu of P31, no charge.

Tilt stand is required for desk top operation, covers are not shaped or strong enough to stand alone.

ACCESSORIES

COVER KITS: field installation of top and bottom covers. For stand alone operation, a tilt stand is required since the covers are not designed to support an instrument.

Price: Model 1310A Cover kit (HP Part No. 01310-68703) \$ 60.

Price: Model 1311A Cover kit (HP Part No. 01311-68703) \$ 60.

TIILT STAND KITS: field installation of tilt stand for stand alone operation.

Price: Model 1310A Tilt Stand kit (HP Part No. 01310-68702) .. \$ 50.

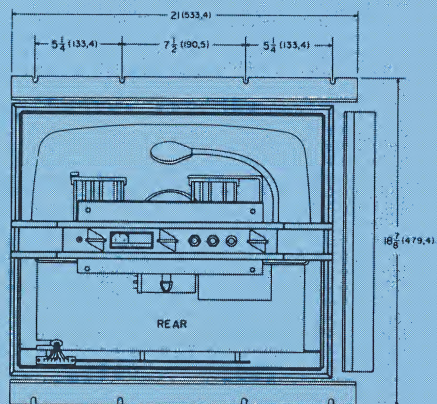
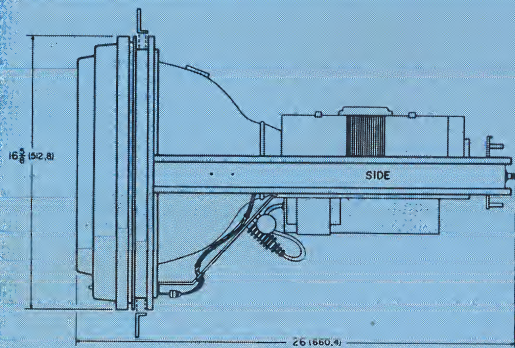
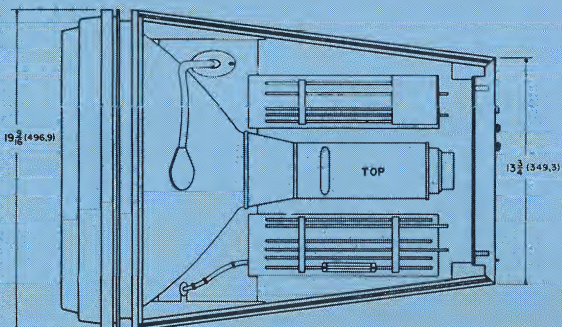
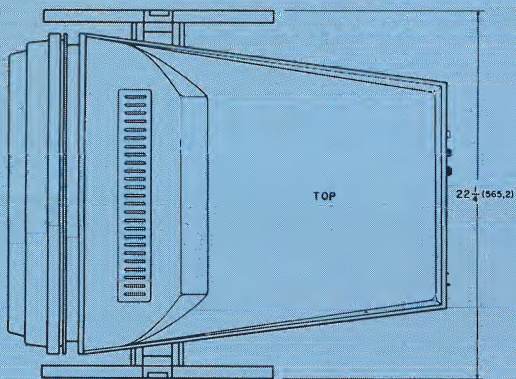
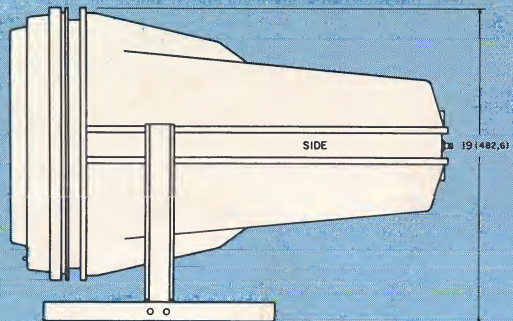
Price: Model 1311A Tilt Stand kit (HP Part No. 01311-68702) \$ 50.

RACK MOUNTING KITS: rack mounting adapter kits are supplied with standard instruments on initial order or may be ordered later as a kit.

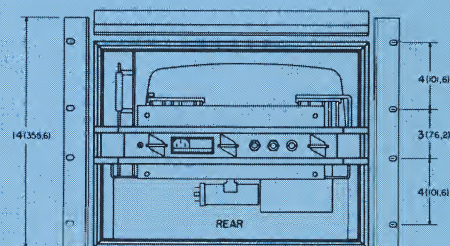
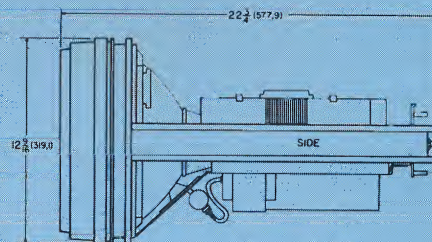
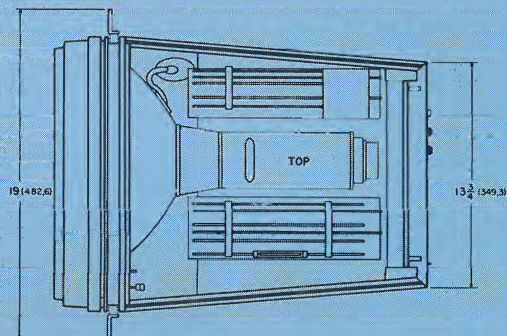
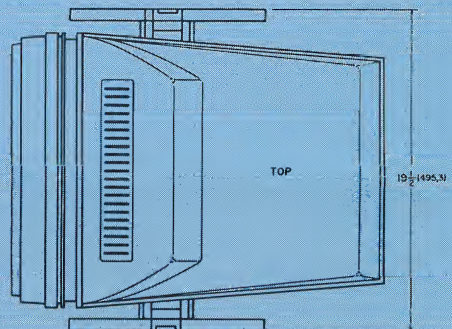
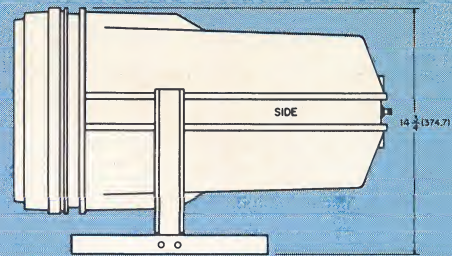
Price: Model 1310A Rack Mount Adapter kit (HP Part No. 01310-68701) \$ 10.

Price: Model 1311A Rack Mount Adapter kit (HP Part No. 01311-68701) \$ 10.

1310A



1311A



NOTE:

- ① DIMENSIONS IN INCHES AND (MILLIMETERS)
- ② DIMENSIONS ARE APPROXIMATE IF MORE ACCURATE DIMENSIONS ARE REQUIRED, CONTACT HEWLETT-PACKARD CO.

TILT STAND, TOP AND BOTTOM COVERS ARE OPTIONAL.

HEWLETT  PACKARD

QUOTATION

IN REPLY PLEASE
REFER TO THIS
QUOTE NUMBER

4937

QUOTE DATE: **December 6, 1971**

PLEASE MAKE PURCHASE ORDER TO:
HEWLETT-PACKARD COMPANY

TO:

Mr. T. Nelson
Box 3
Schooley's Mountain, N. J.
07870

- | | |
|--|---|
| <input type="checkbox"/> 6707 Whitestone Road
Baltimore, Maryland 21207
Telephone 301 944-5400 | <input type="checkbox"/> 39 Saginaw Drive
Rochester, New York 14623
Phone 716 473-9500 |
| <input type="checkbox"/> 1021 Eighth Avenue
King of Prussia, Pa. 19406
Telephone 215 265-7000 | <input type="checkbox"/> 2 Choke Cherry Road
Rockville, Maryland 20850
Telephone 301 948-6370 |
| <input type="checkbox"/> 32 Hartwell Avenue
Lexington, Mass. 02173
Phone 617 861-8960 | <input type="checkbox"/> 1 Crossways Park West
Woodbury, N. Y. 11797
Phone 516 921-0300 |
| <input checked="" type="checkbox"/> W120 Century Road
Paramus, N. J. 07652
Phone 201 265-5000 | <input type="checkbox"/> 5858 East Molloy Road
Syracuse, New York 13211
Phone 315 454-2486 |
| <input type="checkbox"/> | |

YOUR REFERENCE	TERMS	DUE DATE	QUOTE FIRM FOR
Your Information Request Card	N/30		30 days

ITEM NO.	QUANTITY	DESCRIPTION	APPROX. DELIVERY WEEKS	RECOM-SHIPMENT METHOD	FOB POINT	UNIT PRICE	TOTAL
A	1	hp/MODEL 1310A 19" HIGH SPEED GRAPHIC DISPLAY	10	ACP	CS	\$3000.00	
B	1	hp/MODEL 1311A 14" HIGH SPEED GRAPHIC DISPLAY	10	ACP	CS	\$2875.00	

PLEASE DIRECT INQUIRIES
REGARDING THIS QUOTE TO:

Dick Schulte

FIELD ENGINEER

F.O.B. POINT:

AV - AVONDALE, PA.
BH - BERKELEY HEIGHTS, N.J.
CS - COLORADO SPRINGS, COLO.
CU - CUPERTINO, CALIFORNIA
LL - LOVELAND, COLORADO

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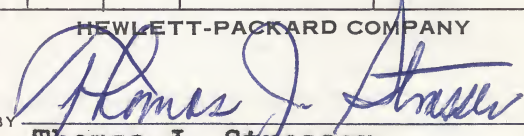
SD - SAN DIEGO, CALIFORNIA
WM - WALTHAM, MASS.
* OTHER

RECOMMENDED SHIPPING METHOD:

ACP - AIR CONSOLIDATION, AF - AIR FREIGHT, MF - MOTOR FREIGHT,
PP - PARCEL POST, REA - RAILWAY EXPRESS, V - VAN.

454 REV. 4/71

HEWLETT-PACKARD COMPANY

BY  **Thomas J. Strasser**

New York Area Manager/ag.

THIS QUOTATION IS SUBJECT TO THE TERMS
AND CONDITIONS ON THE REVERSE SIDE.

ORIGINAL

TERMS: Net 30 days from invoice date subject to the approval of our credit department at the time of shipment. Unless otherwise specified, payment will be due on partial deliveries by Buyer.

DELIVERY: We will make every reasonable effort to effect shipment on or before the estimated delivery dates set forth on our quotation and as confirmed in our acknowledgment to your order. We are not liable for delays due to causes beyond our reasonable control.

SHIPMENT: All prices are f.o.b. place of shipment unless otherwise noted. If requested, transportation charges will be prepaid and will be added to the invoice as a separate charge to be paid by the Buyer. In the absence of specific instructions, Hewlett-Packard Company will ship by the most appropriate method.

ACCEPTANCE: If order contains provisions inconsistent with the provisions of our proposal or acknowledgment, Hewlett-Packard Company provisions shall prevail unless we expressly agree to a specific exception. Clerical errors are subject to correction. All verbal orders and change orders must be confirmed in writing before they can be accepted.

WARRANTY: All Hewlett-Packard products are warranted against defects in materials and workmanship. The period of coverage is specified in the Operating and Service Manuals provided with each product. We will repair or replace, at our option, products which prove to be defective during the warranty period. No other warranty is expressed or implied. We are not liable for consequential damages. Instructions for recommended procedure to receive prompt attention for warranty service should be obtained from the local Hewlett-Packard field office.

PATENTS: The Buyer shall hold the Seller harmless against any expense or loss resulting from infringement of patents or trademarks from compliance with Buyer's designs or specifications or instructions. Except as otherwise provided in the preceding sentence, the Seller shall defend any suit or proceeding brought against the Buyer so far as based on a claim that any product, or any part thereof, furnished under this contract constitutes an infringement of any patent of the United States, if notified promptly in writing and given authority, information and assistance (at the Seller's expense) for the defense of same, and the Seller shall pay all damages and costs awarded there-in against the Buyer. In case said product, or any part thereof, is in such suit held to constitute infringement and the use of said product or part is enjoined, the Seller shall, at its own expense, either procure for the Buyer the right to continue using said product or part, or replace same with non-infringing products; or modify it so it becomes non-infringing; or remove said product and refund the purchase price and the transportation and installation costs thereof. The foregoing states the entire liability of the Seller for patent infringement by the said products or any part thereof.

TAXES: Unless otherwise stated, all prices are exclusive of state and local use, sales and similar taxes. Such taxes when applicable will appear as separate additional items on our invoices.

ADDITIONAL TERMS: If the order references a government contract number or is certified under DMS Regulation No. 1 or BDSA No. 2, the following terms which appear in the Armed Services Procurement Regulations shall apply:

Additional Terms and Conditions

INSPECTION: All articles shall be subject to inspection by the Buyer to the extent practicable at all times and places, including the period of manufacture, and in any event prior to acceptance. (ASPR 7-103.5(a), May 1958).

PACKING: Unless a preferred packing method is provided elsewhere in the order, all articles shall be packaged and packed for shipment and storage in accordance with the best commercial practices. All packing will conform to requirements of carriers' tariffs.

The following ASPR Clauses are incorporated by reference:

1. Changes—ASPR 7-103.2
2. Inspection—ASPR 7-103.5(a)
3. Title and Risk of Loss—ASPR 7-103.6
4. Disputes—ASPR 7-103.12(a)
5. Renegotiation—ASPR 7-103.13(a)
6. Officials not to Benefit—ASPR 7-103.19
7. Covenant Against Contingent Fees—ASPR 7-103.20
8. Notice and Assistance Regarding Patent and Copyright Infringement—ASPR 7-103.23 (9-104)
9. Stop Work Orders—ASPR 7-105.3
10. Notice to the Government of Labor Disputes—ASPR 7-104.4
11. Excess Profit (Vinson-Trammell Act)—ASPR 7-104.11(a)
12. Military Security Requirements (when applicable)—ASPR 7-104.12(a)
13. Examination of Records—ASPR 7-104.15
14. Gratuities—ASPR 7-104.16
15. Priorities, Allocations and Allotments—ASPR 7-104.18
16. Quality Program—ASPR 7-104.28
17. Termination for Convenience of the Government—ASPR 8-701(a) (7-103.21)
18. Default—ASPR 8-707 (7-103.11)
19. Federal, State and Local Taxes—ASPR 11-401.1(c) (7-103.10)
20. Convict Labor—ASPR 12-203 (7-104.17)
21. Contract Work Hours Standards Act—Overtime Compensation—ASPR 12-303 (7-103.16)
22. Equal Opportunity—ASPR 12-804 (7-103.18)
23. Walsh-Healy Public Contracts Act—ASPR 12-605 (7-103.17)
24. Buy American Act—ASPR 6-104.5 (7-104.3)
25. Utilization of Small Business Concerns—ASPR 1-707.3(a) (7-104.14)
26. Utilization of Concerns in Labor Surplus Areas—ASPR 1-805.3(a) (7-104.20)

HEWLETT  PACKARD

QUOTATION

IN REPLY PLEASE
REFER TO THIS
QUOTE NUMBER

4937

QUOTE DATE: December 6, 1971

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TO:

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07870

- | | |
|--|---|
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* OTHER

RECOMMENDED SHIPPING METHOD:

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2154 REV. 4/71

CUSTOMER

HEWLETT-PACKARD COMPANY

BY Thomas J. Strasser

New York Area Manager/ag

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3320-0454 REV. 4/71

HEWLETT-PACKARD COMPANY

BY

Thomas J. Strasser

New York Area Manager/az

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CUSTOMER